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ABSTRACT

A novel polarization maintaining optical fiber, which can be used as a high-power polarization maintaining fiber laser or amplifier, is described. Insensitivity of the polarization state to external fiber bending and temperature changes is accomplished by minimizing polarization mode-coupling via reducing stresses inside the fiber core via increasing the fiber diameter. Alternatively, polarization mode-coupling can be minimized by an optimization of the fiber coating to minimize stresses at the interface between the fiber and the coating. As a result insensitivity to polarization mode-coupling is obtained at greatly reduced values of birefringence compared to small-diameter fibers. The fiber is of significant use in any application where polarization stability is important, and will be useful in telecommunications applications in particular for reducing polarization mode dispersion. An implementation in a parabolic pulse-producing fiber laser is also described as one specific high power example.